Touch Friendly Controls

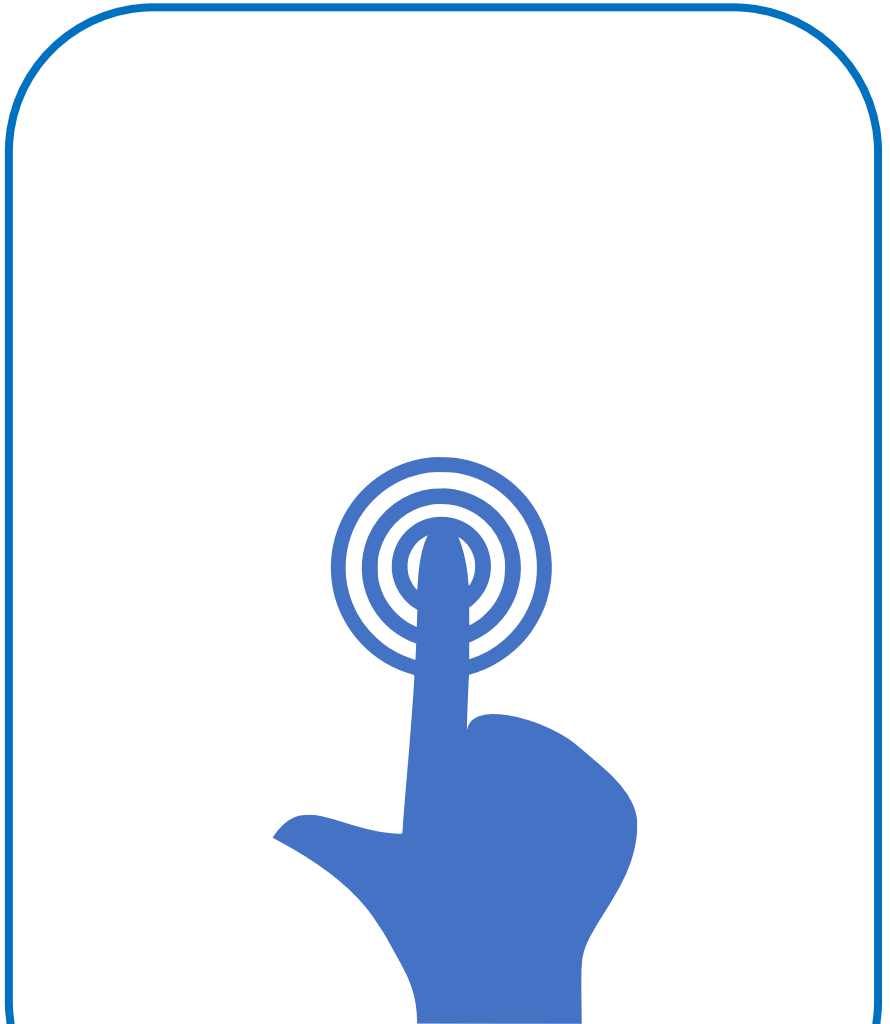
And how to specify their sizes on the screen

Touch target size

Any screen element that people can click, touch, or otherwise interact with should be large enough for reliable and comfortable interaction.

Touch target location

In addition to size the location of the touch target also influences how easy it is to use it.



Fitts's Law

Fitts's Law

- Paul Morris Fitts Jr. (b. 1912) was a psychologist who developed a model of human movement which went on to become one of the most successful mathematical models of human motion.
- Fitts' Law is a mathematical model stating that the time required to move a pointer (like a mouse cursor) to a target area is a function of the distance to the target divided by the size of the target.
- In practical terms, this means that the longer the movement distance and the smaller the target, the more time the movement will take.
- The law is widely applied in user experience (UX) and user interface (UI) design to improve navigation efficiency.

Source

Fitts's Law

Time required to rapidly move to a target area $\approx$ $\frac{\text{distance to the target}}{\text{width of the target}}$

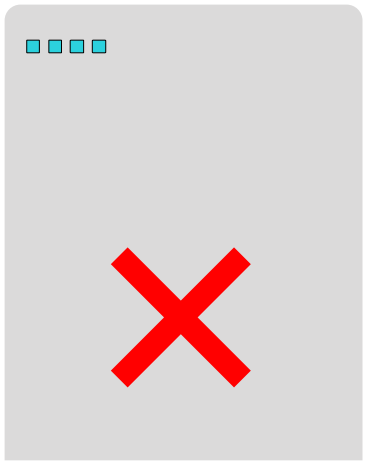
$$\mathrm{MT} = a + b \cdot \mathrm{ID} = a + b \cdot \log_2\left(\frac{2D}{W}\right)$$

Touch target size

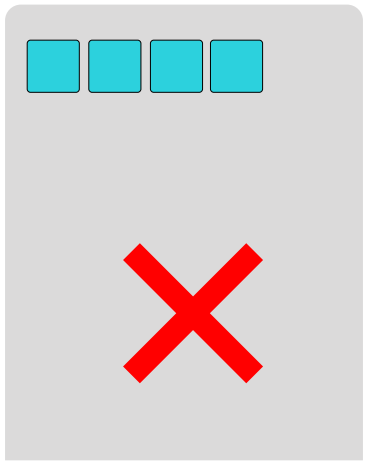
Usability experts in Nielsen Norman Group recommend that interactive elements are at least:

- 1cm × 1cm (0.4in × 0.4in) in physical size.
- positioned with enough space from other touch targets for easy and accurate interaction.
- read the complete discussion on their website.

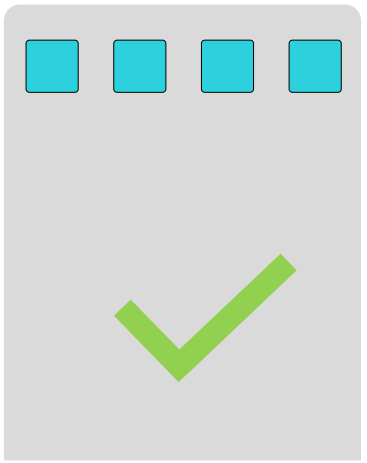
Touch target size and spacing



Touch target are too small



Touch target are the right size but too close together

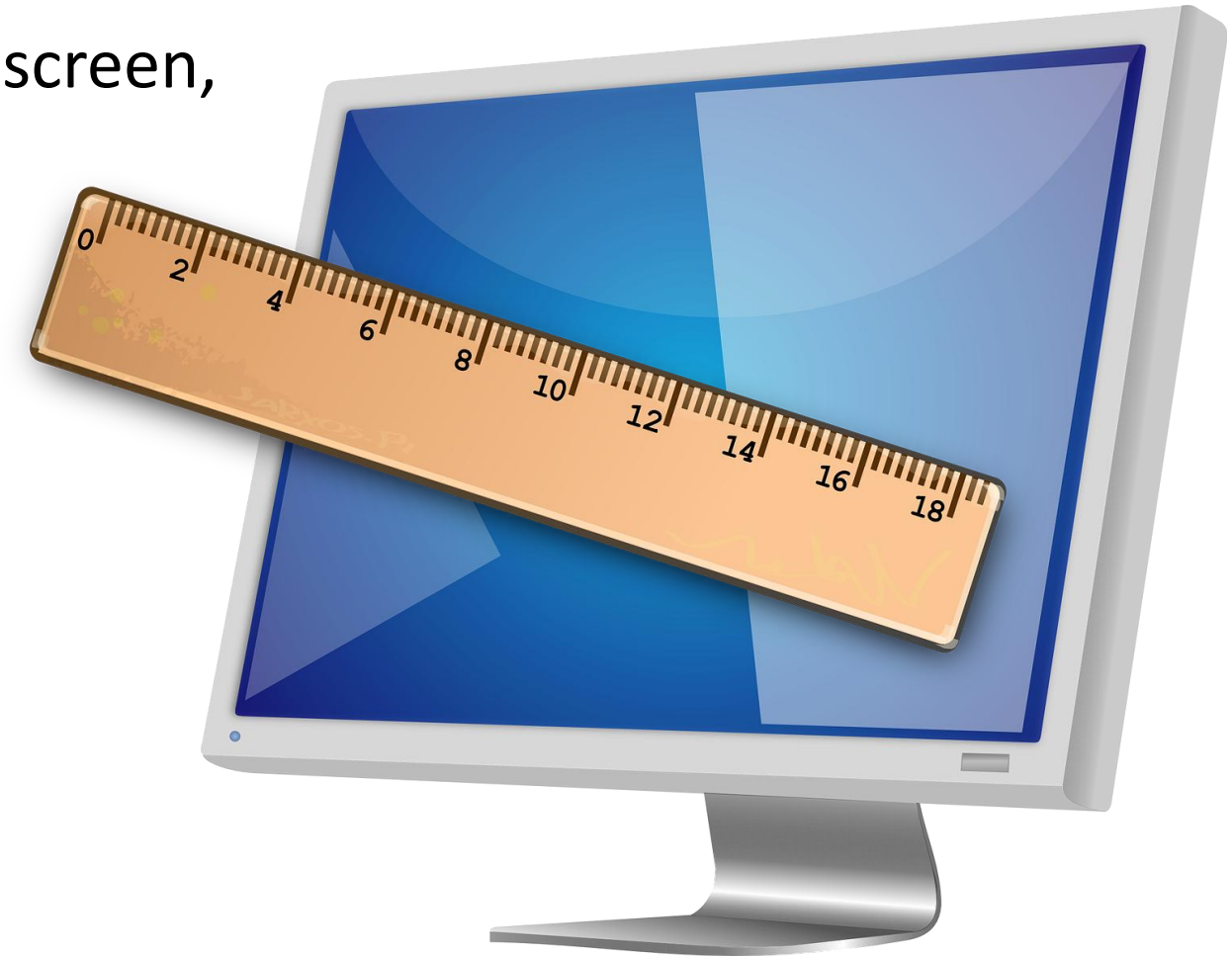


Touch target are the right size and spacing

Measuring Screen Elements

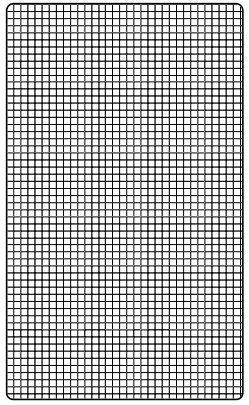
How would you measure 1 cm on a screen?

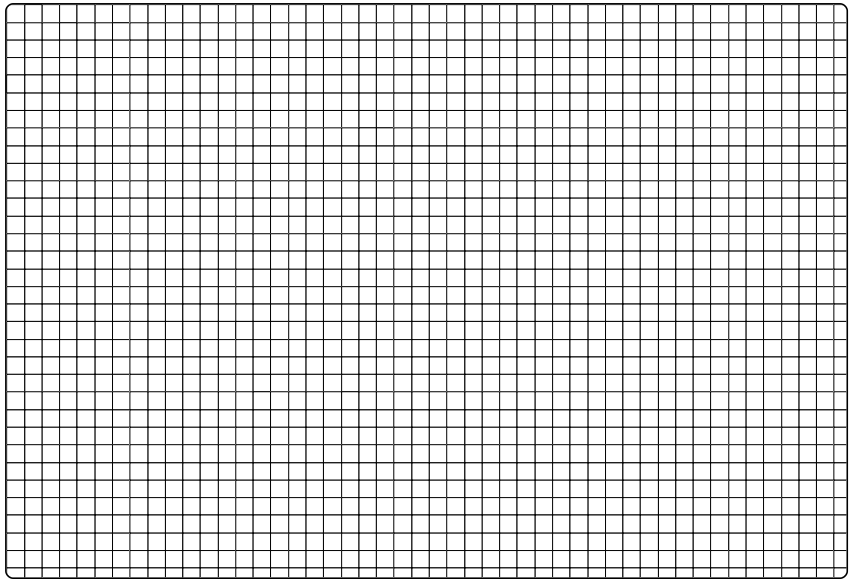
Yes, you can hold a ruler to the screen,
but this is not practical.



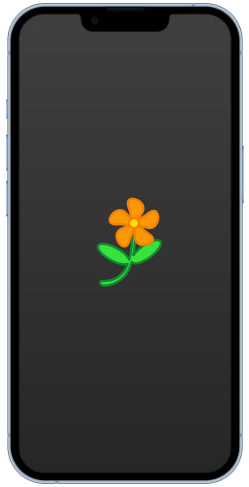
The Problem with Pixels

- Screen elements are usually measured in pixels, but pixel's size is dependent on the pixel density (dpi, or dots per inch) of the screen.
- High-density screens have more pixels per inch than low-density ones, resulting in smaller pixels.
- As a result, text and graphic elements of the same pixel dimensions appear larger on low-density screens, and smaller on high-density screens.





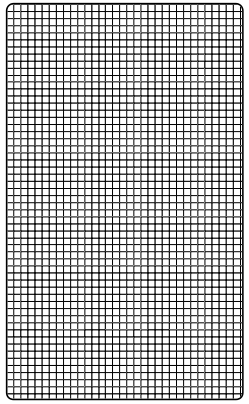
The Problem with Pixels

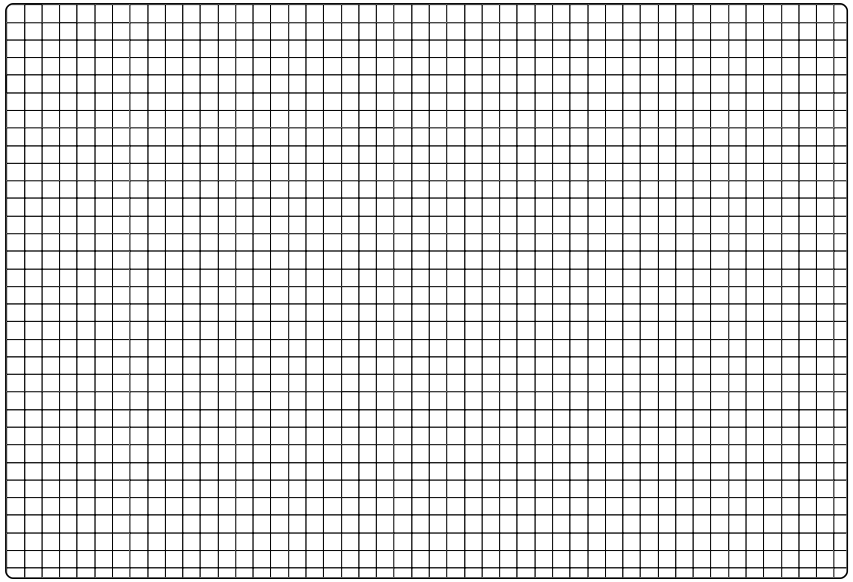


The same pixel size image looks smaller on an iPhone than on a computer monitor because the iPhone has a higher pixel density.

Density-independent pixels

- Google, Apple and other technology organizations have defined new units of measurements that are independent of pixel density.
- You can read about Google's density independent pixels here or go to the next slide for a summary.





Measuring the Google Way

- Google created a new unit named *dp* (density independent)

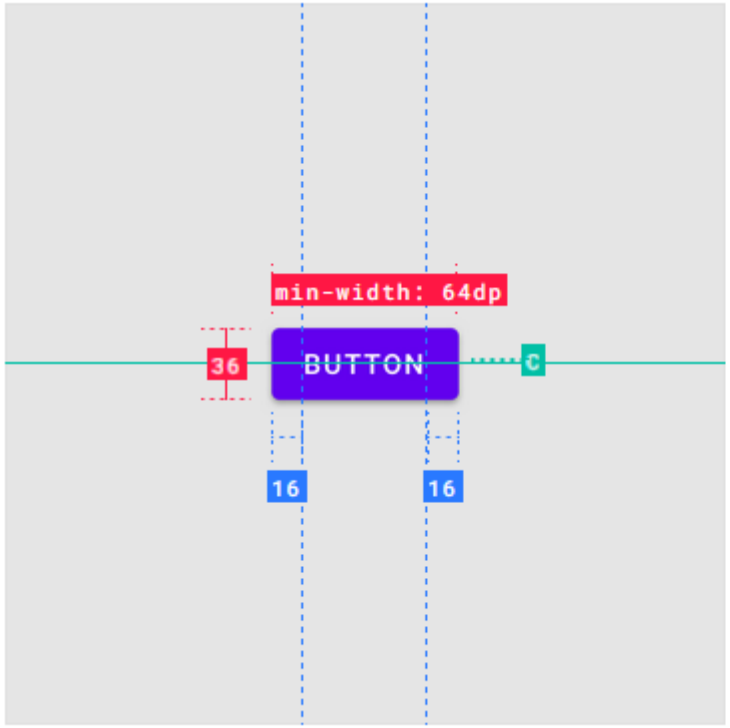
1 dp = 1 physical pixel on a display with a density of 160

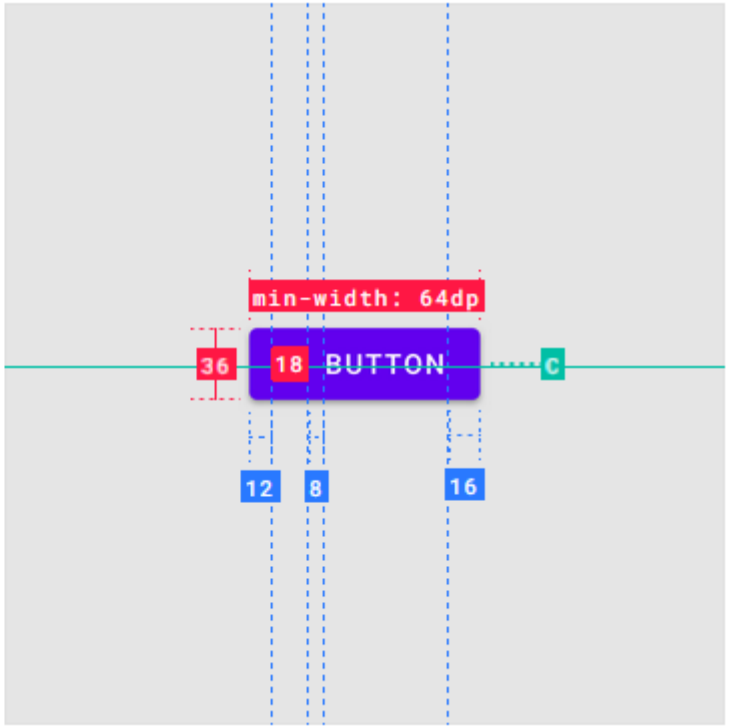
1dp ≈ 1/160 of inch ≈ 0.16 millimeter

- A button with a size of 48x100dp will look the same size on any screen density.
- If you develop apps for a Google system, such as Android, you can specify dp sizes and the system will do the necessary resizing to make sure it *looks* the same on all screens.

Measuring the Google Way

- The new unit (*dp*) allows Google to recommend sizing for interface elements, including touch targets and spacing.
- This image is from Google Material Design specifications of button design.
- All the numbers are in *dp*.



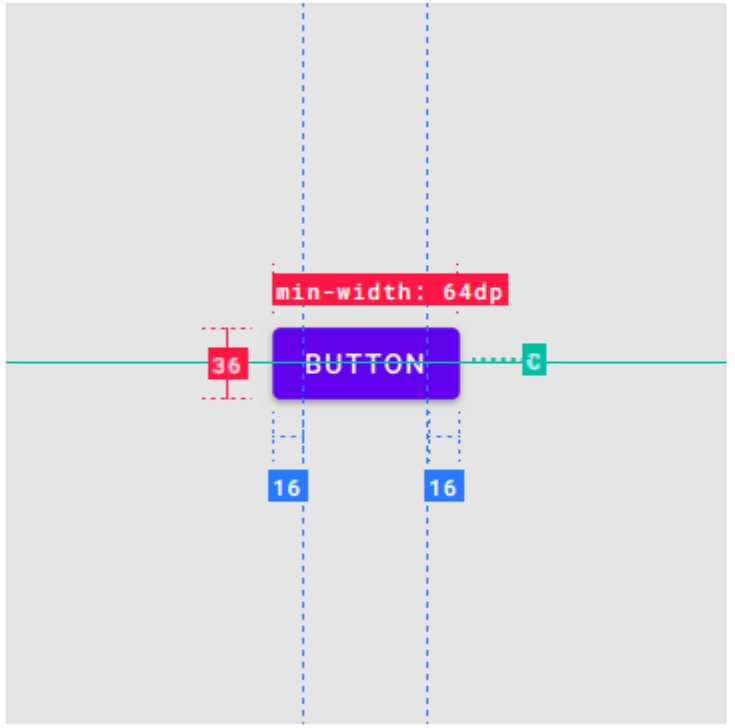


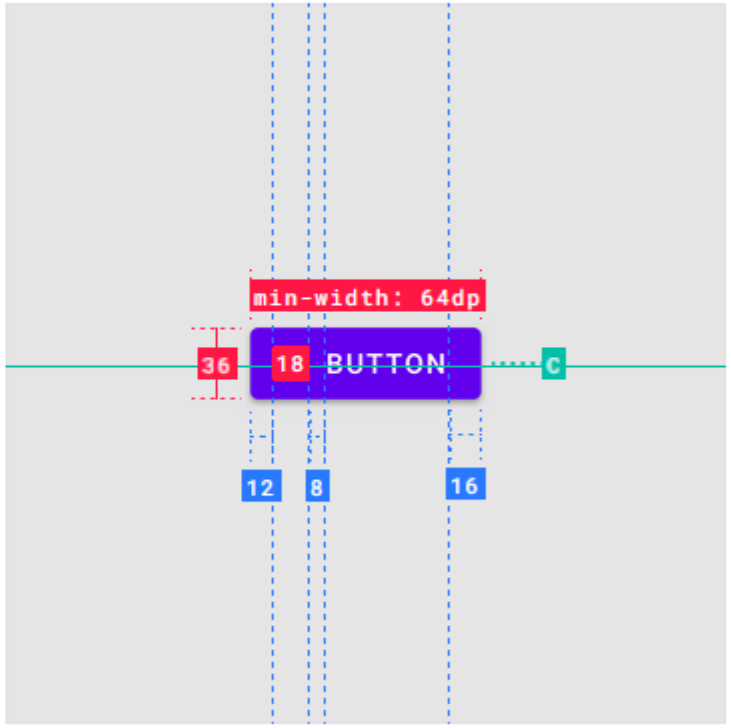
Measuring the Apple Way

- Apple has taken a similar approach but a chose a different name for its unit: *point*, or *pt.*
- The physical size of the one *point* is roughly the same as one *dp.*
- Read about it in this excellent article.

Back to Google's Button Specs…

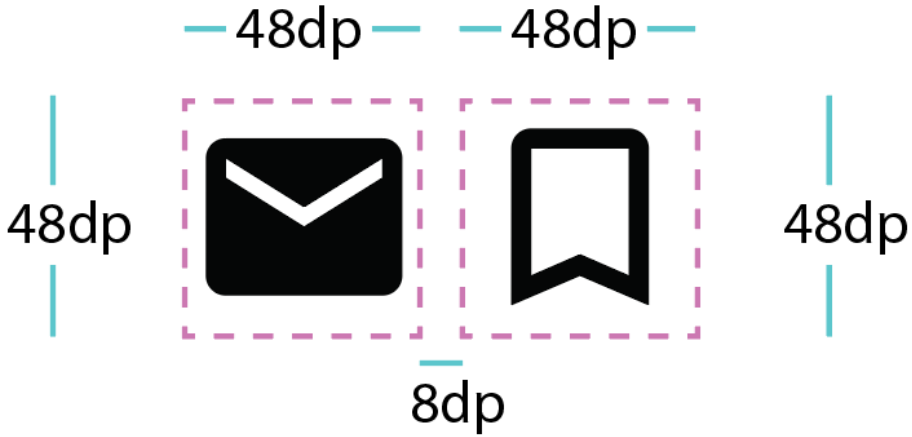
- Material Design guidelines recommend that buttons on mobile devices are sized 36dp high with a minimum of 64dp wide.
- 64dp ≈ 1cm, which agrees with Nielsen and Norman Guidelines.
- 36dp ≈ 0.57cm is smaller than 1 cm but works well with enough spacing around it.





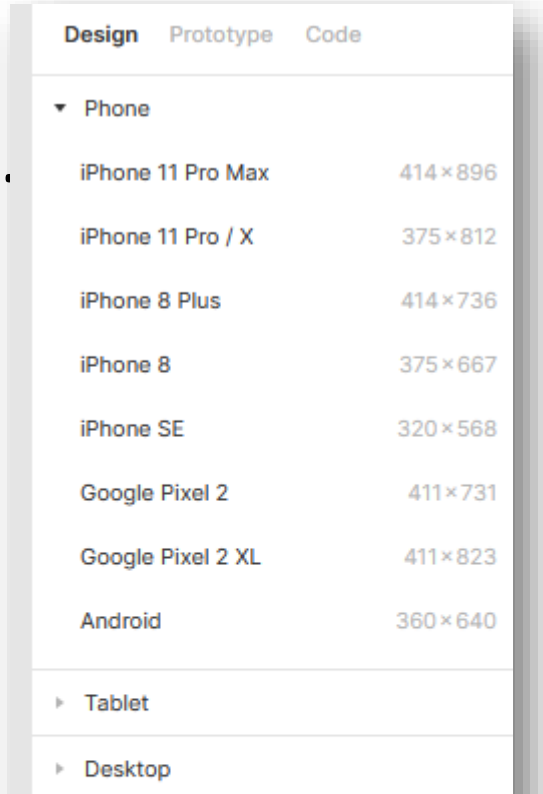
Back to Google's Button Specs…

- Generally, Material Design principles recommend that touch targets should be at least 48 x 48dp, with at least 8dp (or more) between them.
- The visible area of the touch target can be smaller than 48dp as long as the clickable area is at least 48x48dp.
- In the illustration on the right the icons are smaller than 48x48dp but a box of 48x48dp is defined as the touch target for each icon.

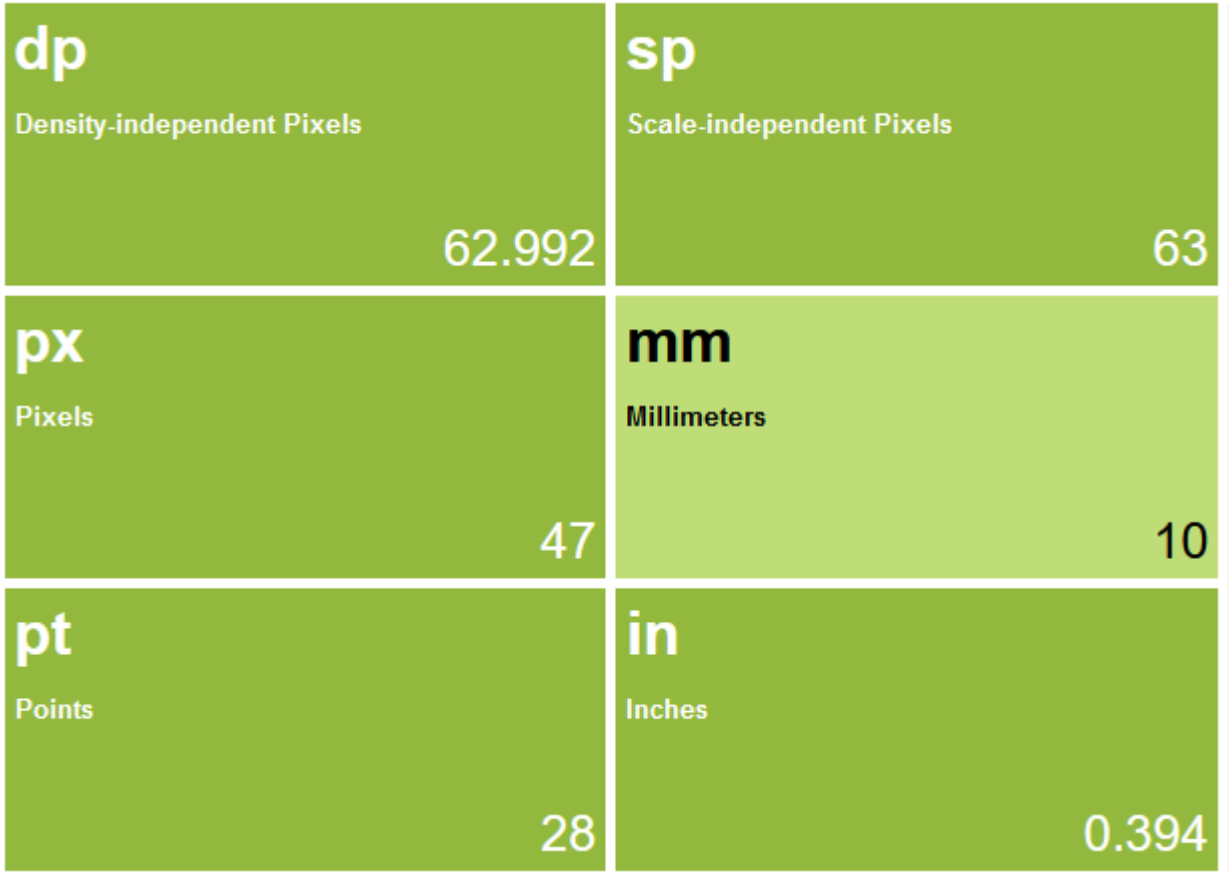


How to Use Google Specs?

- You are encouraged to use Google Material Design guidelines.
- You can directly type the dp measurements recommended by Material design in Figma, as long as you set your frame size correctly.
- Choose one of Figma's presets for your frame size.
- The presets specify the viewport dimensions of devices.
- Viewport dimensions are scaled down versions of device resolutions that correspond with the Google *dp* and the Apple *point* units.
- To specify your device exact viewport look for it here.



Android Pixel Calculator



Click on the image for a calculator